CLAIMS

What is claimed is:

1    1.    An apparatus for allocating a processing resources to functions in a queue waiting

2    to be executed, comprising:

3           a capacity determining means for determining an amount of the processor resource

4    available to be assigned;

5           a load determining means for determining an estimate of an amount of the resource

6    needed for each function waiting in the queue to execute;

7           a prioritization means for prioritizing each of the functions in a queue waiting to

8    be executed; and

9           an allocating means, which receives information from said capacity determining

10   means, said load determining means, and said prioritization means, for allocating the

11   available resource to the functions based on a hierarchical priority scheme.


1    2.    The apparatus of claim 1, wherein:

2           the functions are decomposed elements of a more complex process and do not

3    require the same amount of resource to execute.


1    3.    The apparatus of claim 2, wherein:

2           multiple instances of any function within the process may be invoked by the

3    processor to execute concurrently.


1    4.    The apparatus of claim 3, wherein:

2           each of the functions within the process is assigned a separate priority within the

3    hierarchical priority scheme.


**Atty dkt T-32145**

1  5.    The apparatus of claim 4, wherein:

2        each instance of each function within the process is assigned a separate priority

3  within the hierarchical priority scheme.


1  6.    The apparatus of claim 2, further comprising:

2        an assigning means, in communication with said allocation means, for assigning a

3  resource throttling value to each function waiting in the queue to be executed, wherein the

4  throttling value determines the reduction of the resource allocated to each of the

5  functions.


1  7.    The apparatus of claim 1, wherein:

2        the allocation of the available resource to the functions waiting in the queue is

3  conducted to optimize the amount of the resource assigned to these functions.


1  8.    The apparatus of claim 1, wherein:

2        the allocation of the available resource to the functions waiting in the queue is

3  conducted to optimize a combined number of instances of each function concurrently

4  executed.


1  9.    An apparatus for allocating a processing resource to functions in a queue waiting

2  to be executed, comprising:

3        a capacity determining means for determining an amount of the processor resource

4  available to be assigned;

5        a load determining means for determining an estimate of an amount of the resource

6  needed for each function waiting in the queue to execute;

7        an allocating means, which receives information from said capacity determining

8  means and said load determining means, for allocating the available resource to the

**Atty dkt T-32145**

9   functions based on a hierarchical priority scheme, wherein

10       said load determining means calculates a product, for each of j instances of k

11  functions, obtained by:

12          (a)    estimating the amount of resource needed to support the execution of

13                 the $j^{th}$ instance of the $k^{th}$ function;

14          (b)    assigning a value of either zero or one to a multiplicand associated

15                 with the $j^{th}$ instance of the $k^{th}$ function; and

16          (c)    multiplying the estimated amount of resource needed to support the

17                 execution of the $j^{th}$ instance of the $k^{th}$ function by its associated

18                 multiplicand and assigning the result to the product associated with

19                 the $j^{th}$ instance of the $k^{th}$ function; and

20       said load determining means calculates a sub-total sum, for each of the j instances,

21  obtained by:

22          (d)    summing together the products associated with each of the k

23                 functions of the $j^{th}$ instance; and

24          (e)    adding an estimate of the resource needed to support background

25                 processing associated with the $j^{th}$ instance to the sum of the products

26                 associated with each of the k functions of the $j^{th}$ instance and

27                 assigning the result to the sub-total for the $j^{th}$ instance.


1  10.   The apparatus of claim 9, wherein:

2       the multiplicand value associated with the $j^{th}$ instance of the $k^{th}$ function is

3  determined according to the hierarchical priority scheme.


1  11.   The apparatus of claim 9, wherein:

2       said load determining means repeats the steps (a) through (e), recited in claim 19,

3  for each of a number of sequential time periods; and

                    **Atty dkt T-32145**

4  said allocating means reallocates the available resource to the functions in each of

5 said time periods based on a hierarchical priority scheme.

1 12. The apparatus of claim 11, wherein:

2  said load determining means establishes a variable length time period that is no

3 longer than the period needed to execute any one of the j instances of the k functions that

4 are executing concurrently.

1 13. The apparatus of claim 11, further comprising:

2  for each of the j instances of the $k^{th}$ function, said prioritization means assigns

3 increasingly higher priority in accordance with an increasingly greater number of time

4 periods that have passed since the $j^{th}$ instance of the $k^{th}$ function was last executed.